Green River beds, although they are abundant in the formations deposited before and after that period. Until its proper position can be ascertained, I propose that the formation be called the Manti beds.—*E. D. Cope.*

THE SKULL OF EMPEDOCLES.—This genus, originally described[1] from vertebræ, proves to be allied to *Diadectes*, and to be one of the most remarkable forms of the Permian fauna. With that genus it forms a family, the *Diadectidæ*. The skull of *E. molaris*[2] displays the following characters:

The relations of the quadrate and zygomatic arches are as in the *Theromorpha* generally. The pterygoids extend to the quadrates, and the vomer bears teeth. The brain-case extends to between the orbits, and its lateral walls are uninterrupted by fissures from this point to near the origin of the *os quadratum*. There is an enormous frontoparietal foramen. The mode of connection with the atlas is peculiar. There is a facet on each side of the *foramen magnum*, which then expands largely below them. The bone which bounds it inferiorly, presents on its posterior edge a median concavity. On each side of this, is a transverse cotylus, much like those of an atlas which are applied to the occipital condyles of the *Mammalia*. They occupy precisely the position of the Mammalian condyles. The median point of their upper border, which forms the floor of the foramen magnum, is produced in the position occupied by the median occipital condyle of a reptile. From its position between the cotyli, the section of this process is triangular. The element in which the cotyli are excavated has the form of the mammalian basioccipital, and of the reptilian sphenoid. It is not the batrachian parasphenoid. Its extreme external border on each side where it joins a crest descending from the exoccipital, is excavated by a circular fossa which looks outwards.

The character of this articulation is so distinct from anything yet known among vertebrated animals, that I feel justified in proposing a new division of the *Theromorpha* to include the *Diadectidæ*, to be called the *Cotylosauria*.

It will be remembered that in *Diadectes* the maxillary teeth are transverse, and molar-like. There is a distinct canine. In *Empedocles* there is no distinct canine, but the incisors are distinguished by their form, having more or less distinct transverse edges. For the present I refer *D. latibuccatus* to *Empedocles*.—*E. D. Cope.*

GEOGRAPHY AND TRAVELS.[3]

THE INTERIOR OF GREENLAND.—The Danish Government having recently instituted an examination by a scientific commission of the interior of Greenland, has now published the first part of

[1] Proceed. Amer. Philos. Soc., Phila., 1878, p. 516.
[2] *Diadectes molaris* Cope, AMER. NATURALIST, 1878, p. 565.
[3] Edited by ELLIS H. YARNALL, Philadelphia.

a report giving the results of these researches. A recent number of the *Nature* (February 12, 1880) gives a *résumé* of the work, from which we take the following:

"The work contains four memoirs of great interest: an account of the expedition upon the inland ice, made by Lieut Jansen in 1878; a record of the astronomical and meteorological observations made during this journey; notes on the geology of the west coast of Greenland, by M. Kornerup; and remarks upon the plants collected by the last named explorer, by M. Lange.

"Starting from the neighborhood of Frederikshaab, in South Greenland, Lieut. Jansen traversed a distance of forty-six miles over the continental ice. Here he found, as did Dalager, who made a similar attempt from the same point in 1751, that a number of islands of rock (Nunatakker) rise above the general level of the great sea of ice, and upon these rocky islets no less than fifty-four species of plants were collected."

Of the character and movements of this great sheet of ice we learn that:

"1. At a distance of 75 to 76 kilometres from the shore, the continental ice attains a height of 1570 metres (5115 feet), and must be of considerable thickness, since its inclination to the east from the Isblink of Frederikshaab averages only 49′.

"2. On that part of the continental ice which has been explored, even at a great distance from the shore, are found many 'Nunatakker,' which influence to a great extent the movements of the ice, in some cases actually bringing about a reversal of the direction.

"3. The surfaces of dislocation resulting from the movement of the ice are almost vertical in the midst of the continental ice, but they incline at the edge and near the 'Nunatakker,' where the slope of the ground is great, and the upper parts of the ice, in consequence, move more rapidly.

"4. The crevasses are partly perpendicular, partly parallel to the direction of the movements, following the nature of the inequalities of the rocky bed, and in places where the ice takes a fan-like disposition, both radial and tangential crevasses are observed.

"5. Around the 'Nunatakker' and the rocks near the shore the surface of the continental ice is impregnated with fine rocky *débris* (sand and clay), which are brought there by tempests, and which brooks carry from a distance to the cavities of the continental ice. The masses of clay thus collected give rise to the pyramids of ice which, near the Isblink of Frederikshaab, attain an elevation of nearly sixty feet.

"6. Moraines of different form are found on the continental ice, especially near the 'Nunatakker,' and they must be referred to the classes of ground moraines and terminal moraines. They frequently form curved or semi-circular lines, and inclose well-

rounded masses of stone of no great magnitude, which in their advance fall into the crevasses."

The exposed rocks along the coast and in the islets which rise above the great ice-sheet are found to be mostly composed of gneiss, with some mica, talc and hornblende-schists, and occasional patches of granite.

New proofs are furnished of the gradual elevation in past periods of the west coast. "Five sets of raised beaches are described occurring at heights of 28, 57, 94, 192 and 326 feet above the sea-level respectively. On the other hand there is clear evidence that the land is, at the present time, slowly subsiding, the extent of this movement being shown to have been at Lichtenfels from six to eight feet since the year 1789."

FINSCH'S EXPEDITION TO THE NORTH PACIFIC.—Dr. Otto Finsch, a naturalist of wide reputation, having recently completed an account of his last journey through Western Siberia, has now undertaken to visit the less known islands of the Northern Pacific. He reached Honolulu in July last. He sends home an interesting account of the effect of the introduction of new species of plants and birds upon the native species. Large numbers of mainas, a kind of starling *(Acridotheres tristis)* have been imported from China, and by driving away the pigeons and fowls, and destroying the nests and eggs of the domestic birds, have become a great nuisance to the inhabitants. The mainas are very active and vociferous, and when gathering by hundreds at their roosting places, the noise is indescribable. The European house-sparrow has also reached the Sandwich islands, and are only second in numbers to the mainas. Another introduced species is the turtle-dove, brought also from China. To find the native birds it was necessary for Dr. Finsch to travel into the interior. Even here they were scarce, and he complains that both the native forests and birds are rapidly being destroyed. On August 21st, Dr. Finsch arrived at the Marshall islands, landing on "Jaluit," or Bonham island. This island being much visited by the natives of the other neighboring and little known islands, afforded him excellent opportunities for his ethnographic studies.

GEOGRAPHICAL NEWS.—A valuable paper, "Observations on the Physical Geography and Geology of Madagascar," accompanied by a physical sketch map, by James Sibree, Jr., was given in *Nature* for August 14, 1879. It contains much new and valuable information about this great island which is the third in size in the world, and nearly four times larger than England and Wales. —— *Nature* notices an amusing mistake in a German scientific work, "Das Leben der Hauskatze und ihrer Verwandten," where the following extraordinary statement occurs: "Die schwanzlose Katze von der Insel Man *im stillen Ocean* wenn nicht das *Kap Man auf Borneo* darunter zu verstehen," etc., thus first placing

the Isle of Man in the Pacific ocean and then doubting its existence, and suggesting it may be a cape of the same name in Borneo!!—— Accurate measurements made by the Russian authorities in the ports of the Baltic, have undoubtedly proved that the level of the sea at Cronstadt is, by nearly two feet, higher than at Reval, and that the height decreases regularly from north to south; this conclusion being fully supported by Prussian measurements at Memel and at Kiel.——The *Revue de Geographie* has recently published some statistics of the census of Japan. Only five cities have over 100,000 population, viz: Tokio 595,905, Ohosaka 271,292, Kioto 238,603, Nagava 125,195 and Kanazava 109,850. Yokohama has only 64,602 inhabitants, Nagasaki 29,660 and Hakodate 28,800.——In a communication to the London *Academy* (January 24, 1880) upon the archæology of Southern Italy, M. Lenormant well says, that "geographers have not hitherto paid sufficient attention to the general fact of the displacement of the centers of population throughout this region at the beginning of the middle ages. The Greek cities were all placed on the sea shore, or at a very short distance from it, in positions favorable to traffic by sea, but ill adapted for purposes of defence. During the centuries when Saracen corsairs were masters of Sicily, and periodically ravaged the coasts of Southern Italy, these positions became untenable, exposed as they were to devastation of every kind. The inhabitants abandoned them and withdrew some five or six miles from the sea, leaving the coast absolutely deserted." "Now, since security has returned to the coast, thanks to the suppression of piracy in Barbary, which continued to desolate these regions until the taking of Algiers by the French, a precisely opposite movement is in progress. The first step was to plant the sea-board and cultivate it afresh without leaving the inland districts. Next, within the last few years, the railway has been constructed which skirts the Ionian sea. Now the inhabitants are gradually descending from the towns built in the middle ages on the heights which, twenty years hence, with the exception of Catanzaro and Squillace, will be in turn almost deserted."——The results of a recent scientific exploration of Sumatra are to be given to the world in a magnificent work embracing four volumes. The geography of the country will be contained in one of these which will also include the meteorology and geology, while the other books will be devoted to the ethnology, natural history and languages of Sumatra and a narrative of the journey. The Dutch edition will first appear, but it will doubtless be translated into one at least of the more widely known languages.——The French Geographical Society are considering the practicability of adopting some uniform system of spelling in their publications, thus quickly imitating the similar resolution of the Royal Geographical Society.—— The New York State Survey has ascertained that in a dis-

trict covering about 2000 square miles, in one of the most populous parts of the State, and containing two important cities and nearly two hundred villages and hamlets, *every one* of these towns or villages is misplaced from one to two miles on all existing maps. The Director, Mr. James T. Gardner, remarks: "Colorado was not a greater surprise to me than has been the structure of my native State. In the study of the origin of some of the most remarkable features lie untrodden tracts of knowledge which are yet to awaken deep interest. The configuration of a part of Central New York is as unique and as unknown to science as that of any part of the Rocky mountains."——"Studien über das Klima der Mittelmeerländer," by Theobald Fischer, published as a supplement to *Petermann's Mittheilungen*, is an exhaustive monograph on the climate of the shores of the Mediterranean. An interesting account of the famous winds, the Maestral, the Bora and the Sirocco, is given with many tables and charts illustrating the records of temperature and rainfall. He also discusses the evidence for change of climate, within historic times, afforded by the fauna and flora. When the African elephant was tamed by the Carthagenians, the camel was unknown in North Africa, whereas now the camel is indispensable on the desert and the elephant and rhinoceros have both disappeared from the region. There is no evidence of such a change in the climate of the countries north of the Mediterranean as would prevent their recovering the position they held in ancient times. The rainfall, though, owing to the destruction of the forests, it is differently distributed, is the same in amount and sufficient for agricultural needs. In the countries, however, lying south of lat. 34° N. greater changes have taken place, the rainfall being decidedly less in amount than formerly. Vast tracts have become uninhabitable, the desert is ever encroaching upon the steppe, the springs are drying up in the oases, and the larger mammals are abandoning the region. Only a local influence could be exerted by the proposed inland sea in Algeria, but the planting of forests might produce greater results. ——Mr. Alexander Forrest, brother of the well-known explorer, Mr. John Forrest, has recently made a successful journey in north-western Australia, during which he explored the country lying between the De Grey and Victoria rivers. Starting February 15, 1879, from the former river and proceeding northwards to King's Sound, the party then followed up the Fitzroy river for a distance of 250 miles. It is navigable for small vessels for about 100 miles. Leaving the Fitzroy at 17° 42′ S. lat. and 126° E. long., they journeyed north-west towards Collier bay for 140 miles, ascending a table land 2000 feet high, but were obliged to return to the river, owing to the ruggedness of the country. They then, on July 10th, started for the overland telegraph line, marching in an E. N. E. direction, and reached the Victoria river near its junction with the Wickham, after a march of 340 miles.

During this part of their journey they discovered a vast extent of fertile country, abounding in grass, and intersected by numerous large rivers, all running north and north-west. Great numbers of natives were seen, and for the most part they were fine, big men, but they had evidently never seen Europeans before. Leaving the Victoria, they came to an almost waterless country, and after terrible sufferings finally reached the Katherine telegraph station. They arrived at Port Darwin on October 6, 1879.[1]

MICROSCOPY.[2]

AGENCY FOR EXCHANGING OBJECTS.—A Microscope Exchange Bureau has been opened by Herman Poole, No. 23 W. Swan street, Buffalo, N. Y. Slides are to be sent to the exchange in quantities of not less than six, and accompanied with a list of desiderata. One of each six will be retained by the agency, and the rest will be exchanged as requested, so far as may be possible.

EXCHANGES OF APPARATUS.—Several subscribers desire to make exchanges of apparatus. A Crouch student's monocular stand, and Schrauer binocular, and several choice lenses are offered, either for a Beck or Crouch binocular, or a Powell & Lealand large monocular, or for lenses of other powers, or for cash. Particulars can be obtained from the editor of the Department of Microscopy of the NATURALIST.

AMERICAN SOCIETY OF MICROSCOPISTS.—The executive committee of this Society have decided to accept the invitation received from Detroit, and the meeting next August will therefore be held in that city. The precise date is not determined at the time of this writing. It is certain that the citizens of Detroit will give a generous welcome to the Society; and a large and important meeting is expected. Correspondence in regard to papers to be offered, or other scientific business of the meeting, should be addressed to the president-elect, Prof. H. L. Smith, of Geneva, N. Y.

OBSERVATIONS ON THE CONSTRUCTION OF THE HUYGHENIAN EYE-PIECE AS USED IN MICROSCOPES.—The difference in the conditions under which the Huygenian eye-piece is used in the microscope, as compared with the telescope, for which it was first devised, and the adaptation of the eye-piece to those conditions, has received but little attention from microscopists, and there are discrepancies in the few statements published in regard to the subject. The following examination of some of the oculars now in use on microscopes was undertaken to determine whether their construction conformed to any general principles. The examination was made by means of a heliostat and focometer, by which the dismounted lenses could be arranged in any position with reference to each other. The lenses being arranged in the foco-

[1] For fuller details of this expedition see *Zeitschrift der Gesellschaft für Erdkunde zu Berlin*, 1879, p. 436.

[2] This department is edited by Dr. R. H. WARD, Troy, N. Y.